THE VETERINARY RECORD

A Weekly Journal for the Profession.

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No. 1231. FEBRUARY 10, 1912. VOL. XXIV.

JOHNE'S DISEASE.

Recently the Central and Associated Chambers of Agriculture decided to ask the Board of Agriculture to appoint a Departmental Committee to enquire into Johne's disease. Certainly the time seems ripe for the formation of such a Committee. It might result in the institution of experimental work—perhaps to prove as valuable as that undertaken a comparatively short time ago upon epizootic abortion—and it would certainly increase our knowledge of the disease and its incidence in this country. So few years have elapsed since the condition was first recognised as existing here that we have still much to learn regarding its prevalence and rate of increase. It seems to be spreading, but it is possible that its frequent detection in hitherto unsuspected localities—in which it may have existed for a long time—may account for some of this apparent increase. A Departmental Committee could at least answer the question whether the disease is now, or is likely to become, sufficiently widespread to warrant legislation against it. At present, considering its mortality and the futility of treatment, it certainly seems that legislation might save the country from heavy losses in the future.

SKIN STERILIZATION.

Our French contemporary, *La Semaine Veterinaire*, in the course of some editorial remarks upon the simplicity and efficacy of the method of sterilising the skin for operation with tincture of iodine, raises an interesting question. Is not the alcohol in the agent at least as potent a factor in obtaining success as the iodine? Very probably it is. The theoretical principle of the method is to flood the skin with some germicide capable of penetrating the microscopic clefts and spaces within the epidermis, which previous washing with soap and water would tend to occlude. Many substances would probably serve the purpose as well as preparations of iodine; as some are known to do. Our contemporary mentions the old veterinary dressing of tincture of aloes as possibly destined to revival; and the same might be said of other tinctures formerly used as dressings, such as myrrh. Petrol and benzine, again, have both been found efficient substitutes for tincture of iodine. Many other agents, especially tinctures, would probably be just as useful, while free from the liability of tincture of iodine, unless very fresh, to form the objectionable hydriodic acid. There is room for further work here; for the new method of skin sterilisation has so much to commend it, in veterinary practice especially, that we should learn more of the various agents which may be utilised in it.

STREPTOCOCCAL INFECTION IN SHEEP.

Six times within four years, in the carcases of sheep sent for investigation to the bacteriological institute of the Königsberg Chamber of Agriculture, a disease has been demonstrated, a constant feature of which was that streptococci could be cultivated in great numbers from all the organs. J. Wiemann now publishes (*Zeitschr. für Infectionskrankh. u.s.w. der Haust.*) an account of this disease.

The affected sheep show, as an especially striking symptom, an exceedingly soporous condition, lying or standing apathetically. They lose flesh rapidly, and the appetite almost completely fails. The pulse is quickened, but the temperature is not particularly elevated, and the respirations, so long as the lungs are not affected, are calm. Then symptoms set in from the seat of the primary affection, through which the disease can manifest itself in three different forms, viz., as endometritis with consecutive peritonitis, as catarrh of the upper air passages, and as enteritis.

As a rule the disease appears first amongst the ewes, often a short time after lambing, and then spreads to the other sheep. The first cases take a very acute course, and are fatal in a few days. In these cases the pathologico-anatomical appearances are very insignificant. But when the disease is of longer standing in a flock, its course gradually becomes subacute, and now the respiratory cases become more frequent. The animals die in from 7 to 14 days, and show severe fibrinous pleurisy and pericarditis upon post-mortem examination.

In lambs the disease is almost always acute or peracute. The animals often die in from 6 to 24 hours, especially the lambs of affected mothers.

The disease is endemic in character, and is often confined to single compartments of the shed. When the shed is abandoned, and the diseased animals separated from the healthy ones, the disease disappears It must, therefore, be transmitted to the sheep, in the first place, from the floor of the shed, but a direct transmission from sheep to sheep can also occur.

Probably the favourite portal of entry of the virus to the organism is the physiologically hyperæmic genital tract after parturition. But the germ can penetrate by other mucous membranes, especially those of the oral and nasal cavities and of the intestines, and also by wounds of the external skin.

The pathogenic germ, a streptococcus, is present in all the affected organs, in the secretions and excretions, and is especially numerous and easy to demonstrate in the blood.—*Berliner Tier. Woch.*

Bilateral Intercommunication of the Lymphatic System.

H. Baum discusses (*Deutsche Tierarztl. Woch.*) the question of whether lymph-vessels pass over the median line to communicate with those on the other side of the body. Despite the great practical importance that pertains to this subject, it has hitherto been almost unstudied in animals. Baum, having carried out extensive injections of the lymphatics, concludes as follows;—In the ox, there are lymphatic vessels which pass over the median line, and open into the lymphatic glands of the other half of the body. This especially applies to the lymph vessels of the medially situated portions of the outer skin, the point of the tongue, the hard palate and the gums, the lower lip, the thyroids, the trachea, and œsophagus, the lungs, the thymus, the kidneys, the longus colli, and the vasa efferentia of the mammary lymphatic glands.—*Berliner Tier. Woch.*

Large Round-Celled Sarcoma (Primary) in an Ox's Lung.

Primary sarcomata in the lungs of animals are rare. Franz Halász, however, records (*Allatorvosi Lapok*) finding a fungus-like neoplasm arising from the lung of an ox upon a peduncle 4-10th inch long by 1 1-5th inch broad. The neoplasm itself was 3 1-5th inches broad, and was rugged; the pleura covering it was smooth, shining, and transparent. The sectioned surface of the neoplasm was grey-red sprinkled with black-red spots; it was soft in consistence, and was easily lacerated. Microscopically it was found that the neoplasm was encased in a capsule of connective tissue, from which septa of connective tissue proceeded, dividing the neoplasm itself into "islands." In the septa were large roundish connective tissue cells, and also smaller round cells with round nuclei.

The starting-point of the sarcoma in this case was the interlobular connective tissue of the lung; and, as the tumour originated superficially in the vicinity of the pleura, it was able to extend outwards on account of the lack of resistance against it.—*Berliner Tier. Woch.*

The Treatment of Follicular Mange.

J. Miller reports favourably upon the treatment recommended by Gmeiner, of Giessen, for follicular mange. He describes its lines as follows. At the commencement of the treatment, the hair is removed from the affected parts and their surroundings as completely as possible. The whole body is then cleansed in a bath of ½ to 1 per cent. watery solution of sulphurated potash. A few drops of the following mixture are then applied to the affected parts with either the finger or a soft brush—

Ol. Carui		
Spiritus	*aa.*	10 parts.
Ol. Ricini		150 „

This is rubbed in gently but firmly; and each affected place should be rubbed for at least three minutes, so that the Ol. carni may penetrate as deeply as possible into the skin. Generally this treatment is carried out once daily, but in extensive cases it may be done twice daily.

Miller reports 31 cures, and says that in slight cases the disease can be overcome in a few weeks. Severe cases, such as those of the pustular form of the disease, in which the pustules can be broken and pressed out, require a longer treatment. Cases in which there is great thickening of the skin, indicating a deep situation of the parasites, resist even the above treatment.—(*Berliner Tier. Woch.*)

W. R. C.

606 and Glanders in Experimental Animals.

Infective glanders material obtained from a 3-day glycerine agar culture, was introduced intra-peritoneally in guinea pigs and rabbits, and subcutaneously in cats.

Three different methods were adopted for the 606, viz., Alkaline solution for intravenous, suspension in liquid paraffin for subcutaneous, and neutral suspension for intra-muscular.

Fifty-two animals were used, and the following results were noted:

1. Injection of 606 affected the development of the disease,
2. In case of acute glanders it is possible to sterilise the affected animal by means of blood from another animal that has died.
3. The destruction of the glanders bacilli is probably due to two factors; the chemical action of 606 and the action of bodies formed under the influence of the effect of 606.
4. The best way of introducing 606 is intravenous injection in alkaline solution in dose of 0·1 per kilo of the animal's live weight.—*Revue Russe.*

Diagnosis of Glanders in Dead Meat.

In the slaughterhouse at Leyden, where many horses imported from England are killed, the inspector uses the agglutination and deviation of the complement as a test, and is able to arrive at a conclusion in 8 hours, while the length of time necessary for cultural experiment is too long to be practical.—*Centralblatt fur Bacteriologie,*

Staining Microbes in Sections.

Useful as the methods of Gram and Ehrlich are, for many reasons the following technique may be adopted with good results.

Not only can the organisms be well studied, but the lesions they induce are also rendered clear. Technique:

1. Stain for 3—5 minutes with Grübler's polychrome blue. Wash with distilled water.
2. Differentiate for some seconds with watery solution of Tannin in ether 10%. Wash. Dehydrate rapidly in absolute alcohol.
3. Stain each section for 3—5 minutes in a solution of Eosin 1 : 2000 : Aurantia 1 : 1000 *aa.* Wash. Dehydrate quickly.
4. Clear quickly in Olive oil or Xylol.
5. Mount in Canada balsam. The protoplasm, according to its character, will stain red or yellow, or in a distinct combination of these two

tints. Nuclei and bacilli will be blue. Red corpuscles a bright orange yellow, and fibrin a pale rose.

The following solution is a good preparative for the above method;

Alcohol 5%	Grm. 100.
Sublimate	„ 10.
Acid Picric	„ 5.

After two days in this, place in Acetone pur. grm. 100, Tinct. Iodine grm. 10, for two days; then :—

Acetone pur.	6 hours.
Alcohol abs.	24—36 „
Alcohol Xylol	6 „
Xylol	6 „
Xylol parafin	6 „
Parafin 45°	6—12 „

The method is quite new and has not hitherto been published, but has proved higbly satisfactory in practice.—*La Clin. Vét.*

F. E. P.

NODULAR DISEASE OF THE INTESTINES OF CATTLE.

By Walter Jowett, f.r.c.v.s., d.v.h. (Capetown).

[Abstract].

Nodular disease of the intestine of the sheep ("knopziekte," as it is popularly termed), is quite well known to those interested in sheep-farming in South Africa, but, as far as one can judge by perusal of the literature relating to the diseases of animals in this country, little attention appears to have been paid, so far, to an almost identical nodular disease of the intestine of cattle, which is met with quite frequently, at any rate in Capetown and the neighbouring districts in the Cape Province. There is no doubt that the "knopziekte" of sheep is widely spread throughout South Africa, being met with, in all probability, wherever sheep-farming is carried on at all extensively; whether the closely related nodular disease of the intestine of the bovine animel is equally prevalent, one is not yet in a position to state with any considerable degree of certainty; as already mentioned, it is common enough in the Cape Peninsula, and it is hoped that by calling attention to the subject one may as a result gain some idea as to the prevalence of the disease elsewhere in the Union.

Identity of the Parasite.

The nodular disease of the intestines of bovines was first described by Drechsler of Munich in 1876. Saake afterwards confirmed the findings of Drechsler. Ostertag states that he has frequently seen the sub-mucous nodules in the intestines of cattle slaughtered at the Berlin abattoir.

As to the identity of the larva, the causal agent of this diseased condition, there has been much diversity of opinion, it being, of course, impossible to determine the species of a given parasite of this nature by the mere examination of larval specimens alone, and, as already pointed out, it is only such immature worms which are present in the sub-mucous nodules. The determination of the species, then, rests on the result of examination of adult and sexually mature worms—the males especially—which are present in the *intestinal contents* of the host; these, however, are not invariably present in the lumen of the gut of the ox concurrently with the presence of the larva-containing nodules in its intestinal wall. Moreover, it is somewhat difficult at times to isolaté worms so minute as are those now under consideration from the large mass of material contained in the bovine intestine. The adult parasite occurring in the intestinal contents, even when fully developed, measures only 15 to 20 millimetres in length (roughly about three-quarters to four-fifths of an inch), whilst the larval worm in the nodule is only one-twelfth of an inch long. Strose, and some of the earlier writers who studied this condition, regarded the small nematode present in the nodules as an ankylostome (*A. bovis*), Von Ratz being one of the first to consider it as representing the larval stage of a different species of parasite, namely, an œsophagostome. More recently Marotel has studied the question of the identity of the parasite afresh in France, and, as a result of his researches, he has definitely shown that the nematode present in the nodules is, in reality, a larval œsophagostomum. This investigator finds that the particular species concerned in the case of cattle in France is the *Œsophagostomum radiatum*. According to Marotel, the young nematode passes through at least three successive stages:

(1) A strongyliform larva with a small mouth;
(2) An ankylostomiform larva with an ellipsoid and monodentated mouth: and
(3) An œsophagostomiform larva with an elliptical and cuticular enlargement in the cervico-ventral region.

Says Marotel in this connection: "Each nodule encloses a young œsophagostome of variable shape and development. The length of the worm does not exceed 3 millimetres in the case of the ox (this measurement, of course, refers only to the worm found in the nodule). As long as they measure less than 4 or 5 millimetres, these larvæ correspond to three types: those of 1 millimetre resembie strongyles (strongyliform larvæ); those of 2 millimetres remind one of ankylostomes (ankylostomiform larvæ); those of 3 millimetres are comparable to œsophagostomes (œsophagostomiform larvæ). Finally, the individuals which exceed 4 or 5 millimetres are perfect, but still immature œsophagostomes; in order to reach the adult state, to copulate, and to reproduce, they are obliged to quit the nodules and to gain the lumen of the intestine."

The evolution of the œsophagostome, then, comprises two parts, the one which is effected in the interior of the intestinal nodules, and the other which is passed in a free state in the intestinal cavity: the first is of variable length, in accordance with the species involved.

Here one may state that the iarva found in the intestinal nodules of the South African cattle is, as far as one can judge, identical with the parasite depicted by Marotel as present in similar nodules in the intestinal walls of cattle in France, and, as far as this investigation is concerned, the present writer regards the parasite responsible for the diseased condition here dealt with as an œsophagostome. Whether the species involved in South Africa is *O. inflatum* or *O. radiatum* one is not yet prepared to affirm, more extended study of adult specimens being necessary to decide this point. However, so far, the author inclines to the view that it may be the species last referred to (*O. radiatum*), but one hopes to study this question further as the opportunity to do so presents itself.

Symptoms.

With regard to the symptoms exhibited by cattle, the subjects of the nodular intestinal disease much depends upon (1) whether the infection is a heavy one or otherwise, (2) whether it is recent or of some standing, and (3) the degree of resistance which the host is able to offer against the harmful effect of the parasitic invasion. Says Marotel in this connection—"Clinically it (*i.e.*, the nodular intestinal disease) reveals itself by the appearance of a chronic enteritis, watery diarrhœa, progressive wasting, anæmia, and cachexia; it terminates usually

in three or four months by death in coma, and its gravity is such that in certain cases the mortality reaches the startling figure of 50 per cent." From this description it is apparent that the disease, at any rate as met with in France, is of considerable economic importance. The present writer, however, is inclined to think that the nodular disease of the intestines of bovines encountered at the Cape is somewhat less grave than the picture drawn by the French investigator above quoted. It is not unusual, when conducting post-mortem examinations on cattle slaughtered for food purposes, or on those which have succumbed to some rapidly fatal disease other than the one here dealt with, to find nodules quite numerously present along the course of the intestinal tract, and yet such animals may be in quite good condition, and they may have shown no very obvious symptoms of illness prior to death. On the other hand, there can be little doubt but that where the parasitic invasion is a heavy one, or when it occurs in an animal not in very robust condition, diarrhœa and symptoms of chronic intestinal irritation will be apparent, attended ultimately with more or less anæmia and wasting, and occasionally, perhaps, by death. Such termination, however, is probably not of very frequent occurrence, at any rate in the case of cattle at the Cape.

Obviously, a heavy invasion by the parasite referred to cannot do otherwise than impair the health of the host to a more or less appreciable extent, and to interfere with its nutrition and well-being. It seems justifiable to ascribe some of the diarrhœas of cattle, often seemingly of obscure origin, to this cause. Moreover, it is well recognised that the lesions excited by the parasite may form the starting points of other diseases; the nodules may, in fact, form the portals of entry for various micro-organisms normally occurring in the intestinal tube, and which, though harmless under ordinary conditions—that is *so long as they remain in this position* (in the *contents only* of the intestine)—become decidedly pathogenic once they have gained access to the general circulation.

Differential Diagnosis.

The only disease with which it is at all possible that the above described lesions may be confounded is tuberculosis of the intestine, and this mistake is hardly likely to be made by any one who is in the least acquainted with the lesions of the malady last mentioned. However, examination of the mesenteric lymphatic glands will speedily settle any doubt which may exist, for whilst these are invariably involved in intestinal tuberculosis, they are intact in the case of the nodular intestinal disease (œsophagostomiasis) provided, of course, that the letter is not complicated by some other disease involving the mesenteric lymph glands.

It may not be out of place to call attention to certain lesions of the mesenteric glands, and sometimes also of the liver, which are not uncommonly met with in cattle at the Cape, namely, those due to invasion by the larval form of the Linguatula Tænoides (this larval from being known as the *Linguatula denticulata*).

These "linguatula nodules" vary in size from a pin's head to a pea, or may be even much larger than this, and after a time they assume a greenish or yellowish-grey to a green colour, and are frequently of a caseous, mortar-like, or even calcareous consistency. The colour is somewhat characteristic, but in case of doubt microscopic examination will decide the question; the parasite, or if this has degenerated, then its hooks, will be found in the nodules, whilst of course in the case of tuberculous lesions the specific bacillus can be demonstrated. The writer has found the "pentastome lesions" of the mesenteric glands co-existent in some cases with the parasitic nodular disease of the intestines in cattle at the Cape—a combination of lesions which might deceive the layman, and especially so if only a casual or hasty examination had been made.

Preventive Measures, etc.

With regard to prevention and treatment of the nodular disease of the intestine one has but few remarks to offer. It is obvious that whilst the larvæ remain encysted in the wall of the intestine—that is in the nodules—drugs administered to the host by the mouth will hardly be likely to come in contact with or to have much effect on them.

In the case of valuable animals, one can treat the symptoms of diarrhœa and irritation of the intestine as they arise by the administration of astringents and demulcents—chalk, catechu, and opium in gruel, for example. Raw eggs may be added to this mixture with benefit.

The administration of medicinal agents, such as arsenic, tartrate of antimony, or thymol, will probably rid the host of some of the round worms free in its intestinal contents. Afterwards tonics, such as iron salts (sulphate), and a liberal allowance of rock or common salt, are indicated.

With regard to prevention, naturally, if one is aware that animals become infected at a certain pasture or with one particular water supply, one shoufd remove them, if possible, from such source of infection.

The intestinal contents of slaughtered cattle in which lesions of the nodular disease are present in the intestinal walls should be disposed of in such manner (burning, burying, etc.) that they do not contaminate fresh pasture, since such material is liable to contain adult and fertilised female worms, as well as the ova of these.

There is no reason against the use of the meat of such carcasses for food purposes, provided that it is not emaciated, and that it is otherwise free from evidence of disease.—*Agricultural Journal of South Africa.*

BOVINE TUBERCULOSIS—ITS INTER-COMMUNICABILITY AND DANGER TO MAN.

A. M. Trotter, M.R.C.V.S., Glasgow.

Presented at the meeting of the Scottish Metropolitan Veterinary Medical Society on February 10th.

The discovery of the bacillus tuberculosis by Koch announced in 1882, opened up new avenues for investigation. At that time Koch claimed that "Bovine tuberculosis is identical with human tuberculosis, and is thus a disease transmissible from animals to human beings." Cultures of the bacillus isolated from human and bovine sources inoculated into test animals produced a disease similar in every respect. Maffucci, a few years later, directed attention to differences between the bacilli of mammalian and avian tuberculosis, and for a time these were believed to be two distinct diseases. Kruse and Pansini, working independently, placed on record the isolation of tubercle bacilli from man and cattle which they regarded as belonging to the avian type. Trudeau, in a paper contributed to the New York Pathological Society, referred to differences in the growth of tubercle bacilli isolated from two different sources. The first grew upon glycerine agar in the form of dry scales, and abundantly on potato. The second, upon glycerine agar, had the consistency of thick cream and failed to grow on potato. Crookshank, in 1891, published the results of a comparative study of the bacilli isolated from men and cows, the horse, pig, cat, guinea-fowl, pheasant, and ostrich. He concluded that "morphological differences are found under different circumstances, and within limits the morphology of the tubercle bacillus varies

with its environment." In 1896 Theobald Smith directed attention to certain differences in morphology, biology, and pathogenesis he had found to exist between tubercle bacilli obtained from a tubercular bull and from a bear which had died of the disease. The bear had been, at one time, a household pet, and it is conjectured it had contracted the disease from its master. The bacilli isolated from this animal was therefore presumed to be of human origin. Two years later the same observer published the results of further investigations and pointed out that the tubercle bacilli isolated from bovines differed from those present in the sputum of human consumptives in that the former were shorter, straighter, more irregular in outline, grew less vigorously upon artificial media, were not so influenced by certain modifications of the culture medium, possessed a tendency to remain short, even when grown on media through several generations, and were more virulent; whilst the latter grew profusely and quickly, and when cultivated became long and slender if they were not so at the commencement.

Vagedes, Dinwiddie, and Frothingham, also published papers on this subject, but it was not until Koch's famous pronouncement in 1901. that the matter aroused universal interest, and investigations were at once undertaken by Government Commissions and by noted scientists all over the world. Koch, in his address to the members of the British Congress on Tuberculosis, stated, "I feel justified in maintaining that human tuberculosis differs from bovine, and cannot be transmitted to cattle. .....I should estimate the extent of infection by the milk and flesh of tubercular cattle, and the butter made of their milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it."

These statements were based on the results of a series of experiments which he, in collaboration with Schulz had carried out on nineteen young cattle with material obtained from humans; six had been fed with tubercular sputum almost daily for seven or eight months; four had been caused to repeatedly inhale a large number of tubercule bacilli which had been mixed in water and dispersed through the air in the form of a spray; in the others pure cultures of the bacilli or sputum had been injected under the skin, or into the peritoneal cavity, or into the jugular vein. None of the cattle experimented upon had shown any symptoms of disease and when slaughtered from six to eight months later small suppurative foci only had been found at the place of injection and in which a few tubercle bacilli had been discovered on microscopic examination. Again, six young pigs had been fed daily for three months with the tubercular sputum of human consumptives. Three and a half months later these animals had been slaughtered and on autopsy "no trace of tuberculosis was found, except here and there little nodules in the lymphatic glands of the neck, and in one case a few grey nodules in the lung." Koch, therefore, considered that he was justified in maintaining that human tuberculosis differs from bovine, and that the disease of the former could not be transmitted to the latter. These experiments did not supply an answer to the more important question of whether man is susceptible to bovine tuberculosis. It was, of course impossible to solve the problem by having recourse to the experimental inoculation of man with tubercular material obtained from bovines. Unfortunately, however, there was ample opportunity of determining the transmissibility of bovine tuberculosis to man through the ingestion of milk and its products containing tubercle bacilli. Koch approached this part of the enquiry on the assumption that a case of tuberculosis caused by alimenta can only be assumed with certainty when the intestines suffer first, i.e. when a so called primary tuberculosis of the intestines is found. Taking this as his criterion he instanced that he had only seen primary tuberculosis of the intestines twice; the records of the Charité Hospital, Berlin, showed only ten cases in five years: Baginsky, at the Emperor and Empress Frederick's Hospital for Children, made post-mortem examinations on 933 children affected with tuberculosis, but never found tuberculosis of the intestines without simultaneous disease of the lungs and bronchial glands, and Biedert only sixteen cases among 3104 post-mortem examinations of tubercular children. He was by no means certain that even those few cases were due to infection by bovine tuberculosis. He concluded, therefore, that the danger to man by the milk and flesh of tubercular cattle, and the butter made from their milk was infinitesimal, and he did not deem it advisable to advocate the enforcement of preventive measures against bovine tuberculosis so far as mankind was concerned.

Two days later M'Fadyean (Sir John) delivered a paper on tubercle bacilli in cow's milk as a possible source of tubercular disease in man, in which he submitted Koch's statements to destructive criticism and controverted many of his assertions, and in concluding a masterly oration advocated that we ought not to concede to the milkmen the right to sell us tubercle bacilli, even if we were assured that—like Dr. Koch's experimental pigs—we had nothing to fear beyond the development of "little nodules here and there in the lymphatic glands of our necks," and "a few grey tubercles in our lungs."

The contention of M'Fadyean that human and bovine tuberculosis is inter-communicable was supported by Nocard, Bang, Sims Woodhead, Ravenal, Crookshank, and others.

Crookshank contended that Koch had drawn wrong conclusions from his experiments, and that whilst the tubercle bacilli present in the tissues of man and of animals had undergone modifications in the body of their respective hosts, they were in reality derived from a common ancestor. In support of his contention he quoted two experiments which he had carried out some years previously. In one he had injected human sputum rich in tubercle bacilli into the abdominal cavity of a healthy calf. An autopsy on the calf forty-two days later revealed a tubercular deposit at the seat of inoculation with innumerable secondary lesions on the peritoneum and in the internal organs. In the other he had injected tubercle bacilli intravenously into a calf, with a negative result.

The opinion of Koch, however could not be ignored, and the Government of that day deemed it expedient to appoint a Commission to enquire and report with respect to tuberculosis:—

(1) Whether the disease in animals and man is one and the same;

(2) whether animals and man can be reciprocally infected with it;

(3) under what conditions, if at all, the transmission of the disease from animals to man takes place, and what are the circumstances favourable or unfavourable to such transmission.

The Commissioners caused exhaustive enquiries to be made, and their conclusions are published in reports issued in 1904, 1907, 1909, and 1911.

In the first report they showed that the bacilli found in the lesions of certain cases of human tuberculosis produced in cattle a disease indistinguishable from bovine tuberculosis.

In the second they dealt with bovine and human tuberculosis and embodied the results obtained in the investigation of the characters of the bacillus of bovine tuberculosis.

The third dealt with certain conditions of the tuberculous cow which rendered her milk infective.

Their final report dealt with the whole of their enquiry into the tuberculosis of man, of the ox, pig, horse, and some other mammals and birds.

By adopting certain methods of investigation they

were able to compare the characters of the bacilli isolated from tuberculous lesions in different species of animals. They were thus able to distinguish three types of tubercle bacilli—avian, bovine, and human.

The leading characters of these are stated to be as follows :—

Avian. The avian tubercle bacillus forms a slimy, whitish growth, which is easily emulsified, thus contrasting with the growth of bovine and human tubercle bacilli. It grows especially well on glycerinated media.

Fowls are very susceptible to the action of the avian tubercle bacillus by intravenous, subcutaneous, and intramuscular inoculation, and by feeding. On the other hand the rabbit and mouse are the only two mammals in which the avian tubercle bacillus causes progressive tuberculosis. In the former animal moderately large doses of the avian bacillus, though fatal, are less virulent than the bovine, but more virulent than the human tubercle bacillus. This bacillus never causes progressive tuberculosis in the calf, pig, monkey, guinea-pig, horse, cat, or rat, but it sometimes multiplies in the body and becomes disseminated in the tissues, and may kill if a large dose is given intravenously.

Bovine. The bacillus which was found in natural cases of tuberculosis in cattle is that classified by the Commission as the bovine type, It is regarded as the standard for comparison with the bacilli found in the tuberculosis of other animals. This organism grows slowly on serum, and at the end of the second or third weeks shows on the surface of the media a greyish uniform growth, not wrinkled and not pigmented. It is much more virulent than the Typus humanis. Its virulence, as evinced by the severity of the invasion produced when inoculated into calves or rabbits, and its mode of growth in artificial cultivation, permits of its being differentiated from the human variety. The effect produced in calves and rabbits was striking and definite. The injection of bovine tubercle bacilli into these animals caused an acute generalised tuberculosis which rapidly terminated in death. For instance, the duration of the life of rabbits subcutaneously inoculated with bovine tubercle bacilli was from 28 to 65 days, whilst with human tubercle bacilli the animals survived or were killed in 94 to 725 days.

Human. The bacilli isolated from the majority of cases of human tuberculosis were found to have definite characters which distinguish them from those present in bovines.* These were therefore termed human tubercle bacilli. They grow more rapidly on serum and the growth tends to become wrinkled on glycerinated media, and becomes pigmented to a greater or less extent in all media. Their virulence is, as a rule, not so marked as those of the bovine type when subjected to inoculation tests under the same condition. In the case of the chimpanzee and the monkey, however, the effect is the same—an acute generalised tuberculosis.

A very considerable number of the cases of human tuberculosis, especially in young persons, revealed the presence of bacilli possessing all the characters of the bovine type, whilst the virulence of others was ascertained to be somewhere midway between the human and bovine types. Experiments were undertaken to determine if the latter were transitory forms between these two types, but it was demonstrated by plate cultivation and by the repeated re-inoculation of test animals that these were merely mixed infections. It is common knowledge that certain pathogenic organisms growing in living tissue or on artificial media are influenced by their environment, and after a longer or shorter time their characters and properties are changed. They may either gain or lose in virulence. The human and bovine tubercle bacilli, however, are very stable, and their virulence has been found to be little impaired after prolonged sub-cultivation. There can therefore be no doubt that the tubercle bacilli found in man possessing the character of the Typus Bovinus are of bovine origin.

Of the 108 cases of human tuberculosis—other than lupus—investigated by the Commission, 84 yielded human tubercle bacilli only, 19 yielded bovine tubercle bacilli only, and 5 both bovine and human tubercle bacilli. By far the greater number of cases in which the bovine tubercle bacilli were present were in individuals affected with primary abdominal tuberculosis. Of the 29 cases of primary abdominal tuberculosis investigated, 14 yielded bovine tubercle bacilli, 13 human tubercle bacilli, and 2 a mixture of human and bovine tubercle bacilli. The ages of the patients in which the bovine tubercle bacilli were present were as follows :—ten were aged from 1 to 3 years, three from 4 to 5 years, and one 8 years. It will be noticed that the age period during which the greater number occurred in which the bovine tubercle bacilli were the exciting cause, synchronises with the period when milk forms the bulk of the diet.

It has been known for many years that milk drawn from a cow affected with tuberculosis of the udder contains a large number of virulent tubercle bacilli. The researches of the Commission and others show that it is possible for tubercle bacilli to be excreted in the milk without the udder itself being affected. Milk contaminated with tubercle bacilli is—if used for food—an undoubted menace to the health of the consumer.

In their second Report the Commissioners summarise the result of their enquiries as follows :—

"There can be no doubt but that, in a certain number of cases, the tuberculosis occurring in the human subject especially in children, is the direct result of the introduction into the human body of the bacillus of bovine tuberculosis ; and there also can be no doubt that in the majority, at least, of these cases the bacillus is introduced through cows' milk. Cows' milk containing bovine tubercle bacilli is clearly a cause of tuberculosis, and of fatal tuberculosis, in man."

Their subsequent reports have tended to strengthen this conviction, and to-day the doubt raised by Koch as to the communicability of bovine tuberculosis to man has been completely dispelled. It cannot be too strongly emphasised that bovine tuberculosis is a disease communicable from animal to man and from animal to animal. This fact is of peculiar interest to veterinarians, for the duty will devolve on us of eradicating the disease among animals. The fight will be a stern one. It is impossible for economic reasons to accomplish the eradication of bovine tuberculosis by the application of tuberculin and the indiscriminate slaughter of all reacting animals. The process must of necessity be a gradual one. Our knowledge of the disease is such as to permit of energetic action along right lines. Is it not surprising that no action has been taken to eliminate all dangerously infected animals from our herds? The Board of Agriculture has taken no steps to control the disease among animals, nor have the Local Government Boards for England and Scotland done anything to protect mankind from the undoubted danger arising from the use as food of milk and its products infected with bovine tubercle bacilli. It is true that the Local Government Boards of England and Scotland amended the Dairies, Cowsheds, and Milkshops Order in 1899 providing *inter alia* that article 15 of the 1885 Order be altered so that the expressions therein which refer to diseases should include, in the case of a cow, such disease of the udder as shall be certified by a veterinary surgeon to be tubercular.

In the 1885 Order as so amended local authorities are only empowered to order* that the milk of such diseased cow :—

* In one instance the avian bacillus was found in a nodule in a mesenteric gland of a calf.

* As regards England the Order of 1885 as amended, is made applicable only to paragraphs (*a*) and (*b*).

(*a*) shall not be mixed with other milk;
(*b*) shall not be sold or used for human food; and
(*c*) shall not be sold or used for food for swine, or other animals, unless and until it has been boiled.

It is left to the discretion of local authorities to put these Orders into operation, but allowing for the sake of argument that every local authority faithfully executed them to the full, even then one is forced to the conclusion that they are utterly inadequate to safeguard the public health. The apathy of the Government and the Government Departments to this matter is deplorable. It is even excusable under the circumstances to state that this failure on the part of the authorities to enforce efficient supervision of our milk supply amounts to criminal negligence, because four years have elapsed since the Commission reported that "Cows' milk containing bovine tubercle bacilli is clearly a cause of tuberculosis and of fatal tuberculosis in man. I believe that the majority of local authorities in Scotland have appointed veterinary surgeons under the Milkshops Order and under the Public Health (Scotland) Act, 1897. That is very satisfactory, but please do not probe too deeply into the matter. For instance, some local authorities give the veterinary surgeon a retaining fee of a few pounds, and in addition allow a fee for every animal they are called upon to inspect. It is a pity to rend the veil but duty demands it. Their appointment is a sinecure—they receive the retainer but nothing more, because they are never called upon to examine. No doubt the veterinary surgeons themselves are largely to blame for this discreditable condition of affairs. They ought to take every opportunity of emphasising the importance of the work, and to lay claim to their undoubted birthright of being recognised as the fit and proper persons to safeguard the health of man from animal diseases.

Mr. Watt, the indefatigable member for the College Division of Glasgow, elicited from the President of the Local Government Board for Scotland that the number of cows examined by Veterinary Surgeons, under Article 3 of the amended Order of 1899, in each of the years from 1900 to 1905 inclusive, and the number certified under said Article to be affected with tuberculosis of the udder, were as follows:—

Year.	Examined.	Affected.	Per Cent.
1900	20,076	54	·268
1901	22,604	46	·203
1902	26,382	40	·151
1903	29,870	40	·134
1904	29,305	37	·126
1905	38,309	43	·112

This table is of interest in that it shows a diminishing percentage of animals affected with tuberculosis of the udder. The percentage in 1900 was ·268, but during the succeeding years it gradually diminished until, in 1905, it reached its lowest level, namely, ·112 per cent. This appears satisfactory, in view of the inadequate powers possessed, and, if the statistics be accurate, shows what could be done to safeguard the public health by an examination of all milch cows by thoroughly qualified veterinary surgeons.

A comparison of the number of cows in Scotland with the number of cows examined under this Order shows that, whilst a few authorities are doing their utmost to prevent the sale of milk drawn from animals affected with tuberculosis of the udder, there are a great many other authorities who are doing absolutely nothing—not even exercising the inadequate powers they possess, as will be seen from the subjoined figures:—

Year	Total Cows.	Examined.	Not examined,
1900	434,264	20,076	414,188
1901	433,981	22,604	411,377
1902	438,890	26,382	412,408
1903	437,418	29,870	407,548
1904	439,358	29,305	410,053
1905	437,138	38,309	398,829

Presuming that the proportion of affected cows among those *not* examined is in the same ratio as among those examined in 1900, when inspection commenced, then it follows that there were in

1900.	1901.	1902.	1903.	1904.	1905.
1,110	1,102	1,105	1,092	1,098	1,068

cows, which, though affected with tuberculosis of the udder, escaped detection owing to not having been examined by a veterinary surgeon, and were consequently permitted to yield milk for human consumption, to disseminate broadcast disease and death, and to bring grief and mourning into many a home.

The reply of the Secretary for Scotland to a further question by Mr. Watt was characteristic of the apathy of the Local Government Board, on whom, as the central authority, devolves the duty of controlling and directing the energy of the local authorities. Asked as to the manner in which the cows so certified were disposed of, the reply was, "I have no information as to how the cows certified were disposed of."

It must certainly be admitted that Local Authorities under the powers contained in the amended Order of 1899, are merely empowered to prevent the milk of a cow suffering from such disease from being sold or used for the food of man, or, unless boiled, for the food of swine and other animals. They have no power to slaughter the affected animal. This is a grave defect, and one patent to the merest tyro. A cow affected with tuberculosis of the udder is obviously an animal which is not—and, indeed, can never be—in fit condition to yield milk for human food, but, unfortunately, it may continue to do so for a considerable time.

The mere issue of a verbal or written instruction for the destruction of the milk of a cow so affected does not necessarily mean its faithful fulfilment by the dairyman. There is only one way to accomplish that end, and that is by the slaughter of the animal. There is no hardship in this. Such an animal is of no value for milking purposes, and the sooner it is destroyed the better for all concerned. Some farmers, when they become aware that a cow in their possession is affected with tuberculosis of the udder, cause the animal to be immediately slaughtered, but there are others who are willing to resort to any subterfuge to defeat the object of the Order. The owner frequently attempts to fatten such an animal, but this course is open to many serious objections, one being that the milk of this animal—teeming, it may be, with the organisms of tuberculosis—need not be destroyed, but may be mixed with that of the herd and sold for human food. Again, a dairyman may—and he is at liberty to do so—dispose of the animal for a milk producer to his neighbour. The seller is under no compulsion to say in whatmanner he has disposed of the animal, and the buyer is not compelled to notify the authorities that he is in possession of a cow affected with a disease of the udder. Thus all the efforts of the authorities have been unavailing, and all that they have accomplished, if even that, is that one supply has been purified and, in the purification process, another contaminated.

It is therefore evident that the Dairies, Cowsheds, and Milkshops Order, as amended in 1899, does not afford that protection to human health and life that was anticipated, and we are therefore not surprised to find that, in 1903, certain milk clauses were included in the Burgh Police (Scotland) Act of that year. This Act, which, as its title denotes, applies only to burghs, with the exception of Edinburgh, Glasgow, Greenock, Dundee, and Aberdeen, provides that, "if the medical officer of health of the burgh has reason to believe that milk from any dairy, situate outside the burgh, from which milk is being sold, or suffered to be sold, or used within the burgh, is likely to cause tuberculosis to persons residing within the burgh," then he is to communicate with the local authority of the district in which such

dairy is situate, and it is for the officials of the latter district to take action. It is obvious that, before the burgh medical officer of health can do so, he must be convinced that the milk in question is likely to cause tuberculosis to consumers in his district, and this can only be determined in either of the following ways :— In the first place, he must obtain clinical evidence in the consumers of their having contracted tuberculosis through the use of milk contaminated with tubercle bacilli ; but this, in the majority of cases, is impossible, owing to the length of time which ensues between consumption of the milk and manifestation of the signs of the disease, as also to the difficulty of eliminating all other sources of infection. What a travesty and burlesque of efficient administration, that we are empowered to take action against this national scourge only after it has been allowed irretrievably to fasten its fangs upon its helpless victims ! In the second place, recourse may be had to animal inoculation, that is, taking samples of market milk and injecting small quantities into animals, such as guinea-pigs, but by this method a delay of several weeks must elapse before the result of the examination can be ascertained, and during all this time the milk is continuing to be sold, and it may be disseminating the seeds of disease and claiming numberless victims before the supply can be stopped.

The previous Royal Commission was compelled to direct attention to the continued prevalence of "tabes mesenterica" among the younger members of the com munity, regarding which they stated, as will be found on page 3, par. 2, that "the rate of mortality from tabes mesenterica—which more than any other represents tuberculosis in infancy—has signally failed to undergo any noteworthy diminution during the very period of sanitary progress which has been associated with such substantial diminution of death from tubercular affections at all ages in England and Wales, and (it must also be remembered) that this result has coincided in point of time with a large increase in the consumption of milk."

Confirmation of this result is also found in the late Sir Richard Thorne Thorne's "The Administrative Control of Tuberculosis," in the following striking excerpt from page 29, par 3 :—

". . . . if we limit ourselves to the *first* year of life when milk is most largely used as a food . . . . we find that the reduction in the rate of death from the various forms of tuberculosis—which reduction has been going on at 'all ages' for about half a century—not only disappears, but is actually transformed into a large increase, reaching no less than 27·7%. This in itself is grave enough, but its significance is still further emphasised when we remember what are the circumstances under which this increase in the rate of death from tabes mesenterica has gone on synchronously with a decrease in that from other forms of tuberculosis."

The "milk" clauses of the Burgh Police Act are also defective in that they do not compel the dairyman to notify *all* cases of udder disease, do not insist upon the examination of all the cows being carried out by veterinary surgeons, and do not empower the local authority to slaughter useless animals. They deal exclusively with tuberculosis of the udder, but do not refer to other forms of tubercular disease, and many other diseases, which may equally render milk dangerous and unfit for human food. They appear, indeed, to be modelled on the lines of Section 60 of the Public Health (Scotland) Act, 1897.

This section was framed to cope with milk-borne outbreaks of infectious disease, but tuberculosis is not comparable with such infectious diseases as scarlet fever, diphtheria, or typhoid, in which the incubation period is short and the disease soon manifests itself, whereas in tuberculosis there may be no evident signs of the disease for a long time.

It therefore follows that the procedure which is found adequate to cope with outbreaks of infectious disease proves utterly ineffective when adopted in the vain attempt to prevent the ravages of such an insidious disease as tuberculosis.

The question naturally arises :—"To what extent is man affected with bovine tuberculosis ?" It is not one easy to answer. The statistics compiled by the Registrar General regarding tabes mesenterica cannot be regarded as reliable. These have been largely tabulated from death certificates granted by medical men on opinions formulated after clinical examination alone. Medical men admit that it is impossible to recognise during life many cases of abdominal tuberculosis. We are, therefore, forced to turn to other sources for the desired information.

Northmann, of the Clinic for Children in Düssendorf, and six other investigators, employing tuberculin, found 53 to 94% of the children under 14 years of age to be affected with tuberculosis.

Comby has published reports showing that the post-mortem examination of children in the Paris hospitals revealed 38·5% to be tubercular.

Müller, in Munich, found 43% affected out of 500 post-mortem examinations.

Hamburger and Sluka discovered 41% affected in 401 autopsies on children under 15 years.

Investigations by Shennan, Still, Carr, and Guthrie, to determine the frequency of tuberculosis originating from the alimentary tract show that 28·1, 29·1, 16·7, and 24·6% respectively were affected.

It would be entirely misleading, however, to attribute all cases of tuberculosis in children to bovine origin.

Theobald Smith estimates that from 25 to 50% of the cases of human tuberculosis starting in the cervical and mesenteric glands are bovine in origin.

For the sake of argument let us assume that 50% of all children are affected in some degree with tuberculosis. Twenty-five per cent. of these are infected through the alimentary canal, and of those thus affected 25% are infected from bovine sources. In other words 31 out of every 1,000 children are infected with tuberculosis from bovine sources. No doubt these figures are alarming, but when we consider that of 8,050 samples of market milk examined during the years 1896 to 1911 by Delépine no less than 703 or 8·73% were infected with tubercle bacilli, one is forced to the conclusion that the number of children affected from bovine sources is no greater than one would expect.

The duty which must necessarily devolve on the veterinary profession cannot, however, be limited to the protection of man against the use as food of meat and milk affected with disease. A vigorous warfare must be waged against the transmission of the disease from animal to animal. This entails the slaughter of every animal affected with open tuberculosis, and in many cases improved housing accommodation. I will give but one instance to show the importance of preventive measures.

The Commissioners examined material obtained from 59 pigs. The results obtained are as follows :

Degree of tuberculosis in the pig	Bovine Virus	Human Virus	Avian Virus	Mixed avian and bovine	Tl.
Local	18	3	5	—	26
General	32	—	—	1	33
	50	3	5	1	59

The cases of infection by the bovine tubercle bacillus were by far the most numerous—50 cases out of 59.

The number of pigs in Scotland in June, 1909, is given in the Board of Agriculture returns as 129,819, and during that year 5.1% of the pigs slaughtered in the Glasgow abattoirs were found affected with tuberculosis. As pigs are consigned from all parts of Scotland to the

Glasgow market this percentage may be taken as applicable for the whole country. A simple calculation shows that there were 6620 tubercular pigs, and of these 5610 were infected with bovine tubercle bacilli.

The Commission on Tuberculosis which reported in 1898 recommended that "in view of the greater tendency to generalisation of tuberculosis in the pig, we consider that the presence of tubercular deposit in any degree should involve seizure of the whole carcase and of the organs."

If this recommendation, which has received the imprimatur of the Local Government Boards for England and Scotland, be taken as the standard for the adjudication of the carcases of those pigs infected with bovine tubercle bacilli, it follows that all ought to be seized and destroyed as unfit for human food. Now, assume that each carcase is of the average value of £3 it follows that the pecuniary loss to the pig industry in Scotland would be £16,830—surely a sufficient incentive for the enforcement of stringent preventive measures, apart altogether from the greater necessity of protecting human life against such a fell disease.

What steps ought to be taken to safeguard the public health against this undoubted danger? The existing legislation lays the onus of carrying the present powers into effect on the different local authorities. It is deplorable that the authorities have been remiss in this all-important duty. In 1906, of 107 landward and 250 burghal local authorities in Scotland, only 82 landward and 139 burghal local authorities had exercised their powers contained in the Dairies, Cowsheds, and Milkshops Order and had framed regulations :—

(*a*) For the inspection of cattle in dairies,

(*b*) For prescribing and regulating the lighting, ventilation, cleansing, drainage, and water supply of dairies and cowsheds in the occupation of persons following the trade of cowkeepers and dairymen.

(*c*) For securing the cleanliness of milk stores, milk shops, and milk vessels used for containing milk for sale by such persons.

(*d*) For prescribing precautions to be taken by purveyors of milk and persons selling milk by retail against infection or contamination.

The mere issue of regulations does not mean their efficient enforcement. I know of dairy premises in rural districts which are only visited at long intervals. I impute no blame to the officials, because, owing to their multifarious duties, it is impossible to overtake the work in the manner commensurate with its importance. Another factor which must always be borne in mind is that the majority of the members constituting county councils are directly or indirectly interested in agriculture. It is therefore advisable under certain circumstances for the official to temper his zeal with discretion.

The result is that chaos reigns supreme.

In my opinion the importance of a pure, wholesome milk supply is much too great to continue to perpetuate the unsatisfactory present *régime*. A pure, wholesome milk supply is of national importance, and therefore a national service ought to promote and maintain its purity. It is a question bristling with difficulties. A solution satisfactory to producer, vender, and consumer will only be possible after the whole "pros and cons" have been carefully and dispassionately considered. The report of the Royal Commission on Tuberculosis shows that man incurs grave danger in contracting the disease through the consumption of milk and its products infected with virulent tubercle bacilli. This is but one impurity rendering milk and its products dangerous and injurious to the health of man. I would suggest that in order to determine the best means of promoting and maintaining a pure milk supply, the Government, through the Secretary for Scotland, be asked to appoint a Commission composed of agriculturists, representatives of local authorities, town and county clerks, medical and veterinary officers, and sanitary inspectors, to consider the whole question, and draft a Bill which would have for its object the protection of the public health and the eradication of all animal diseases communicable to man through the milk supply.

IODINE AS THE SOLE DRESSING FOR OPERATION WOUNDS.

Address by REGINALD ALCOCK, M.B., F.R.C.S.EDIN., at a meeting of the Staffordshire Branch of the B.M.A.

Medical opinion concerning the utility of iodine as an agent in the production of asepsis has oscillated between contemptuous neglect and unqualified praise. At the present time its virtues are recognised on every hand, and its exceptional usefulness as a skin sterilisant needs no further emphasis, but reliance on its extended efficacy as the sole dressing to be applied to the operation wound from the date of the operation to the discharge of the case, is, I venture to think, a new departure.

This paper is based on the successful results of 31 cases treated by such a method, which, shorn of details, may be summed up as the treatment of the operation area by tincture of iodine, applied at intervals for the first few days, the incision being left exposed to the air, and only covered by the patient's night clothes.

My acquaintance with the use of iodine as the sole dressing for operation wounds dates back to 30 years ago, when I first remember seeing the practice of my father, who, besides being a hospital surgeon, was also public vaccinator, and it is vividly impressed on my mind that when the children came to have their arms inspected on the week following the vaccination, each arm which showed any sign of redness was painted over with a strong solution of iodine, and simply allowed to dry. This was invariably successful in preventing any spread of the cellulitis.

The first time I noticed iodine being used for the preparation and preservation of catgut was in America in 1907, whilst I saw it used for the sterilisation of the skin of the abdomen in the gynaecological clinic in Vienna in 1908, and this method I adopted on my return.

Last year, immediately after my visit to the annual meeting of the British Medical Association in Birmingham to hear the discussion on the technique of wound treatment, it occurred to me, Why use dressings except iodine to operation wounds, and what is their use? and the more I thought of it the less reason I could see for them in suitable cases, and I at once proceeded to put the idea into practice.

Looking through the literature relating to the sterilisation of the skin, I have been struck with the fact that special stress is laid upon the difficulty experienced in rendering the deeper layers of the skin sterile, and especially with the fact that any moisture of the skin means the detection of bacteria, where previously they were absent, if attempts had previously been made to discover them on a dry skin.

Although this stress is laid upon the action of moisture in macerating the epidermis and letting free the various micro-organisms, in no case does one find any special attention paid to the hair follicles, sweat and sebaceous glands, as possibly being the most important home of these microbes. Norman Walker, in his book on dermatology, says :

"While the sebaceous gland opens with a distinct mouth, either on the surface or into a hair follicle, the sweat duct terminates in the germinal layer. From this point a channel may be traced between the cells of the epidermis, where the sweat communicates freely with the interepithelial lymph, and the duct appears in the well-known corkscrew form in the horny layer."

These so-called sweat or coil glands, according to Unna, are not only concerned with the excretion of a watery fluid, but also in the lumina is a considerable amount of fat; and the fact that the palm of the hand, where, if anywhere, perfect lubrication of the skin is required, contains no other glands but the coil glands is a strong piece of clinical evidence bearing on the character of their excretion.

That these sweat glands play an important part in giving a resting place for these microbes probably explains the difficulty experienced in sterilising the hands, as the palm of the hand contains no other glands except these sweat glands winding intricately through the epidermis.

What Mr. Leedham-Green tells us about the position of the microbes on the skin is also of interest. He says that we may expect to find them wherever fine molecular dirt can penetrate, but not deeper than that, and that we meet them not only on the surface of the cuticle, but between the cells of the superficial layers of the epidermis, and in the entrance of the sweat glands, sebaceous ducts, and hair follicles.

In the North Staffordshire Infirmary we have two preparations of iodine in use—the one for ligatures consists of 1 part of *B.P.* tincture with 15 parts of 60 per cent. alcohol, and the other for application to the skin and wounds consists of 2 per cent. of iodine with 90 per cent. industrial methylated spirit.

This industrial methylated spirit has been used for some little time, and has proved perfectly satisfactory, and from a hospital economical point of view it is of great advantage, as it costs only 2s. a gallon as compared with the 26s. a gallon paid for rectified spirit. It contains only 5 per cent. of impurities in the form of wood-naphtha, as compared with the 10 to 15 per cent. of impurities in ordinary methylated spirit. It also has the great advantage that it does not cause any smarting of the eyes or other unpleasant effects.

The effects of the application of iodine to the skin is, first of all, destruction of the microbes of the surface, and, for a very short distance, by its penetrative powers, of those embedded in the very superficial layers of the skin. Probably as equally important an effect is the locking-up of the micro-organisms in the sweat glands by its hardening action on the skin and the simultaneous contraction of the mouths of the glands.

Haegler noted that the microbes do not penetrate deeply anywhere, either between the cells, or in the sweat or sebaceous glands, but I would suggest (and it is on this suggestion that I base my treatment) that their penetration is deeper in the sweat glands than in the layers of the skin.

Mr. J. M. Graham has shown that iodine penetrates more deeply into the pores of the skin when there has been no preliminary washings, and the freer the skin is from moisture and grease, the more efficient is the action of the iodine.

Objection to the use of iodine has been made on the ground that it causes eczema in children and old people, but the usual experience is that it only causes this phenomenon when the iodine dressing has been covered with gauze or wool, and not when left exposed to the atmosphere, unless it is applied very frequently.

Asepticity of the skin is probably impossible of attainment, but it is quite possible to inhibit the growth of bacteria until the wound itself has become sufficiently resistant.

Our aim in the treatment of a wound is to let it be hermetically sealed against the entrance of outside organisms by its own dried secreted serum, and then to render this sterile to growth of the bacteria, if they should escape from the infected sweat glands.

There is a great probability that tincture of iodine owes a great part of its therapeutic action to the hyperæmia it induces—like the Bier treatment—causing a phagocytosis or intracellular destruction of micro-organisms in the neighbourhood of the wound, as seen in cellulitis, erysipelas, etc., and also on account of the increased flow of blood to the part, causing a more rapid union of the cut edges.

In emergency cases there is no preliminary washing, which would not only macerate the epidermis, but also open the pores of the skin; therefore the area is only dry-shaved, rubbed over with ether, and iodine painted on, which serves to kill the bacteria on the surface and lock up the rest.

The following precautions are considered essential for success: Perfect asepsis is to be observed during the operation. All bleeding points are to be stopped, and the wound rendered quite dry. All abdominal and deep wounds are to be sewn up in layers; peritoneum, muscle fibres, sheaths, and skin to be united separately to give the necessary support. Care is to be especially taken in skin apposition.

No wet swabs are to be used, in order that the skin may be kept dry, and only that blood is to be cleared away which adheres either to a plain dry swab or is removed by the iodine-containing swab when applying it to the stitched-up wound.

Iodine is to be applied immediately after operation, and again three hours afterwards, to render sterile any serum of blood which may possibly have oozed out. The wound is again painted over daily for the next three days only, except in cases involving wounds about the perineum, as the sweat glands in this region are so numerous; in addition, the wound is painted over with iodine every time after urine has been passed.

The method is, of course, only applicable to those cases in which the wound can be completely closed up, and can in no case be used where a drain of any kind is necessary. In all operations where support is afterwards necessary, it cannot be used, as in amputations, excisions, etc.

All the cases treated by this method have given excellent results, not even a stitch abscess having been observed.

I feel that this is a somewhat revolutionary practice in the treatment of wounds, after being used to the elaborate mass of sterilised gauze, wool, and Gamgee tissue which one has been in the habit of applying, and amongst my immediate friends the method was at first received very sceptically, dire consequences being prophesied. I am pleased to say that it is now being adopted by some of my colleagues with the same encouraging results.—*B.M.J.*

A Danger from Iodine.

Propping acknowledges the sterilising properties of tincture of iodine, but utters a word of warning in the *Zentralblatt, für Chirurgie* about its use in abdominal surgery, basing his statements on the results of his own clinical experience, in cases of appendicitis. Animal experimentation has shown the facility with which the tissues take up iodine. Twenty minims of tincture of iodine in physiological salt solution injected into the peritoneal cavity of a dog are sufficient to produce fibrinous adhesions between all the organs. He states, therefore, that tincture of iodine is dangerous for the peritoneum and for the intestines. If this drug be used to disinfect the abdominal skin, sterile dressings should always be interposed between the skin and the bowel drawn out from the wound and wrapped in a sufficient thickness of dressings which have been wrung out in a warm solution of sodium chloride.

DISEASES OF ANIMALS ACTS 1894 TO 1911, SUMMARY OF RETURNS.

Period.	Anthrax. Outbreaks Confirm'd	Anthrax. Outbreaks Reported	Anthrax. Animals Confirm'd	Anthrax. Animals Reported	Foot-and-Mouth Disease. Outbreaks	Foot-and-Mouth Disease. Animals.	Glanders * (including Farcy) Outbreaks	Glanders * (including Farcy) Animals.	Parasitic Mange. Outbreaks	Parasitic Mange. Animals.	Sheep Scab. Outbreaks	Swine Fever. Outbreaks.	Swine Fever. Slaughtered. *
GT. BRITAIN. Week ended Feb. 3	30		36				1	2	125	251	14	73	723
Corresponding week in 1911	24		26				5	6			28	31	252
Corresponding week in 1910		28		31			7	16			22	20	199
Corresponding week in 1909		24		25			14	25			51	26	198
Total for 5 weeks, 1912	122		137				14	35	744	1994	77	302	3263
Corresponding period in 1911	109		122				23	69			151	172	1775
Corresponding period in 1910		152		183			32	98			160	102	690
Corresponding period in 1909		139		175			45	96			190	158	1043

* Counties affected, animals attacked: London 2,

Board of Agriculture and Fisheries, Feb. 6, 1912.

	Outbreaks									
IRELAND. Week ended Feb. 3	...	...	...	...	...	...	3	25	2	8
Corresponding Week in 1911 ...	1	1	...	...	...	...	3	20	2	4
Corresponding Week in 1910 ...	...	...	...	...	...	...	1	17	3	73
Corresponding Week in 1909 ...	...	...	...	...	...	...	3	13	...	...
Total for 5 weeks, 1912 ...	1	1	...	...	...	...	11	111	13	154
Corresponding period in 1911 ...	2	2	...	...	...	...	11	116	19	285
Corresponding period in 1910 ...	2	2	...	...	...	...	13	117	5	156
Corresponding period in 1909 ...	1	1	...	...	...	...	12	85	3	12

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Feb. 5, 1912

NOTE.—The figures for the Current Year are approximate only. * As Diseased or Exposed to Infection

Donations to R.C.V.S.

The Secretary of the Royal College of Veterinary Surgeons begs to acknowledge the receipt of the following donations to the College funds, from

Mr. J. Clarkson, Garforth, nr. Leeds	£1	1	0
Amount previously acknowledged	5	5	0

Grant to Dick Veterinary College.

At a special meeting of Midlothian County Council, held in Edinburgh, a deputation from the Board of the Royal (Dick) Veterinary College attended for the purpose of soliciting financial aid towards the completion of the new College buildings. The Board are still almost £5,000 short of the necessary amount in order to secure the £8,000 conditionally promised by Mr. A. Inglis MacCallum, a member of the Board, as well as a further sum of £5,000 from the Education Department.

Mr. MacCallum said that two chairs in the College were now endowed—namely Pathology and Bacteriology, and Physiology, and the relations of the College with the University of Edinburgh had been drawn closer by the appointment of their teacher of anatomy as a University lecturer on comparative anatomy. Moreover, their students were now eligible to present themselves for the University degrees of Bachelor and Doctor of Science in Veterinary Science. The relationship of veterinary science to public health was of the closest nature, as was abundantly shown by the final report of the Tuberculosis Commission. It was desired to so equip the College that its functions might be adequately and satisfactorily performed.

Mr. Martin, in thanking the Council for receiving the deputation, appealed on behalf of the farmers of the neighbourhood, as well as the College, for a liberal donation.

Dr. Bradley said what they wanted to-day was to produce a body of men with a sound practical training—trained in the sense that they had done things themselves. Lecture rooms nowadays had to take a second place to laboratories and clinical wards, and they wanted a greater and wider accommodation and equipment for actual practical teaching.

It was agreed that a grant be given.

Mr. James Cormack, Colinton, proposed that the sum be £600, to be spread over three years—£200 per year.

Mr. A. T. S. Scott, Crosswoodhill, moved that they give a donation of £300.

Ten voted to give £600 spread over three years, and nine to give a sum of £300 down, the former being accordingly carried.—*N. B. A.*

REVIEW.

SHEEP AND GOATS.—By G. MAYALL, M.R.C.V.S. With 35 plates and 18 figures in the text. Pp. x + 126. Price 3/6 net. Baillière, Tindall and Cox, 8 Henrietta Street, Covent Garden, London, W.C.

This small volume is intended as a companion to the two similar ones, dealing respectively with cows and pigs, which the same author has produced recently. Those who have read either of the first two will have a good idea of the size, scope, and method of treatment of the present third publication.

The two animals it concerns are dealt with in separate sections, overlapping being avoided, in the second section referring to the goat, by frequent references back to advice given upon the sheep in the first section. With regard to both animals alike, the work may be very briefly summarised. It is a succint and elementary guide to the breeds, breeding, rearing, feeding, and general management in health and disease, of sheep and goats, written throughout with extreme simplicity, and especially adapted to the needs of the small holder or

cottage farmer. From this it follows that the book contains nothing that will enlighten either the veterinarian or the really skilled agriculturist; it is intended for a different class of readers, to whom it will be very useful. Many men already do a little amateur stock keeping as an adjacent to their incomes, and many more might do so with profit. This series of popular handbooks will tend both to increase the practice and to improve the methods of its performance. W. R. C.

About Degrees and Diplomas.

The Medical Council is charged with the duty of supervising the separate examining corporations, and of insisting upon such a standard of stringency as may be deemed necessary. The duty thus imposed by the State is really a tacit recognition of the principle of one uniform portal to the medical profession, though, with the usual British love of half-measures, it is not pushed to its logical conclusion—State examinations for all medical students of the United Kingdom. The number of bodies which are competent to grant a registrable qualification is fairly large; and it is in respect of their various distinguishing titles that the public very naturally gets so often confused.

Many schemes have been propounded at different times by would-be reformers of the present makeshift system, but none has been within measurable distance of adoption. One reason for this is doubtless that examinations and the titular distinctions which depend on them are of less importance in the eyes of the general public than tact, clinical acumen, and experience. A man may have passed with the highest possible distinction those examinations which are the best esteemed by the laity (and professional colleagues); but if he be a mere bookworm or have a tactless manner, he will take second place to a man less capable of outwitting an examiner but more conversant with human nature and everyday problems of disease. Examinations, in fact, are no test at all of common-sense, without which no doctor is worth his salt.

At the same time, degrees and diplomas are very far from negligible. They are of the most vital importance whenever there is any public post or office to be filled by competition. Here they have very often an altogether fictitious and exaggerated value, because they are in many cases the only criterion which a non-medical selection committee possesses of discriminating between one candidate and another. Let no student, therefore, imagine that one qualification will be as good to him as another; for he never knows when he may have to submit those he possesses to the scrutiny of men who have no means of assessing those real signs of efficiency which could be taken into account by his professional brethren.

Further, there are certain examinations which are earmarked, as it were, for special purposes; and as such have a special value. The best example is the Diploma in Public Health (D.P.H.), which is now indispensable for anyone who aspires to whole-time employment in the organised sanitary service of the community. Yet the D.P.H. is not of itself a registrable qualification.

There are signs which indicate the future possible extension of the system initiated in connection with public health. At the University of Oxford a Diplomate in Ophthalmology (D.O.) was instituted a year or two ago; so, too, in tropical medicine special tests of attainment have been created by several of the educational authorities; and the D.T.M. is tacitly recognised by the Colonial Office.—*The Hospital.*

Personal.

SWANSTON.—On the 30th January, at Lucknow, the wife of of Capt. Nelson Swanston, A.V.C., of a daughter.

Mr. JAMES HOPE PRIMMER, M.R.C.V.S., who had established what is regarded as a lucrative practice in Dunfermline has received an important appointment under the New Zealand Government. A son of the Rev. Jacob Primmer, the well known and aggressive ecclesiastic, Mr. Primmer inherits the hard-working qualities of his father, and during his short professional career in the west of Fife has made many warm friendships among the farming classes and the general community. At present he is in Germany, where he is further equipping himself for his new duties.—*N. B. A.*

Obituary

HANKS.—Victoria Sophia Clementina, the beloved wife of Frederick William Hanks, of "Eskdale," Wantage, who passed away Feb. 3rd, aged 57 years.

CORRESPONDENCE.

POLYMYOSITIS METASTATICA.

Sir,

In *The Veterinary Record* for February 3rd I was interested to read an extract from the *Berliner Tier. Woch.* on the above disease.

About twelve months ago I was shown an old English sheep dog which exhibited precisely similar symptoms, viz., partial paralysis and localised myositis; moreover the paralysis was most marked shortly after copulation. I suggested that the prostate glands be removed, and a course of nerve tonics be given, but within a few days the owner left the district, and the case was lost sight of.

I should think that this disease is not so rare in the lower animals as is generally supposed, and if our professional brethren who are largely engaged in canine practice would record the most notable of their countless valuable observations, this disease would take its place in our manuals on surgery as a definite condition.

L. L. STEELE.

Beckermet, Cumberland.

CRUELTY PROSECUTION IN GLASGOW.

Sir,

I am not surprised that the two Glasgow veterinary surgeons whom I named in my letter to you a fortnight ago (and whose names you omitted to publish) have made no attempt at replying. I hardly expected that they would enter into a controversy with me. And yet, why shouldn't they? Perhaps they don't read *The Veterinary Record*—but that is unthinkable: everybody reads *The Record*. Is their silence the result of regardful contemplation of their own dignity? Yes, I think it must be their dignity; or can it possibly be that they are afraid? Surely not that They would have every advantage in a discussion. They are two against one ("two minds with but a single thought"—if you had read their certificates, Mr. Editor, you would appreciate the aptness of the quotation). They are men of honours and experience: I am guilty of the crime of being young. Why should they hesitate to give their views for my criticism? Under the covering wing of the R.S P.C.A. they found it an easy matter to annihilate me in the J.P. Court, when I had practically no opportunity of replying. Dignity is a poor excuse for shirking a discussion, and I am driven to conclude that they entertain serious doubts of their ability to emerge successfully from an encounter with me now that they are removed outwith the pale of that "Divinity that doth hedge" the R.S.P.C.A.

Perhaps you will consider, sir, that this is a petty quarrel. but my view of the matter (and I hold to it strongly) is that my work in this case was condemned as a result of grossly mistaken diagnosis on the part of the two veterinary surgeons for the prosecution. I think I am entitled to have a kick like the others.—Yours faithfully,

DONALD CAMPBELL.

66 Main Street, Rutherglen.